

A Review: Dermal Ailments Causing Microbiota

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Abstract

Though skin is protective shield of body still it is prone to not only wounds, burns but also to microbial invasion which may be mainly due to bacteria, fungi or various strains of viruses. Frequently reported dermal ailments are acne, measles, psoriasis, impetigo, cellulitis, molluscum contagiosum, tinea capitis, tinea pedis, atopic dermatitis, chronic wounds, ring worm, scabies, and onychomycosis which have broad spectrum pathophysiological effects. There are several root causes of the onset of development of infectious skin microbiota but major ones are intake of improper diet and lack of personal hygiene awareness and practice. To control these skin microbial diseases further research is required to find out low cost healthy food alternatives and programmed public awareness related to personal hygiene.

Keywords: Skin; microbial invasion; dermal ailments; skin microbiota; personal hygiene.

1. Introduction

Skin is a unique form of connective tissue which not only covers the body surface but also performs thermal and homeostatic regulations by providing a variety of microenvironments e.g., variation in UV contact, pH, moisture, sebum content and topography. But its broad spectrum functioning may disturb due to various factors like skin burns, cuts, growing age and many other dermal ailments [1, 2, 8, 10]. The skin texture may be of different types like sebaceous, moisture having and dry because it is influenced by activity of sweat and sebaceous glands and by growth of hair follicles. As sweat glands are thermoregulatory in nature which are connected to the hair follicles localized in oily sites, biochemically the secretion of sebaceous glands is lipid-rich sebum so serve as a hydrophobic, lubricating and antibacterial shield [2, 3].

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But still there is risk of microbial invasion. The potent sources of microbial invasion may be either of bacterial, fungal or viral origin even sometimes algal too [4]. Moreover, in daily life another potent source of microbial exposure to skin is via various animals and their meat handling either in farms or at slaughter houses [6, 7]. These microbial dermal infections may become severe and can be converted into oncogenic disorders [9].

2. Microbial dermal ailments

Following are the commonly reported types of microbial skin diseases which occur either due to intake of infected diet or microbial exposure through other routes (Table.1):

Table 1: Major skin microbial diseases and their pathophysiology

Skin Disease	Causative agent	Pathophysiology	Reference(s)
Acne	<i>Cutibacterium acnes</i> <i>Corynebacterium</i> <i>Malassezia</i> <i>Staphylococcus epidermidis</i>	Severe inflammation and deep scars	[11, 18-22, 23]
Measles	Measles virus	Severe systemic viral disorder of approximately 9–19 days duration which initiates fever and malaise then cough, coryza and conjunctivitis.	[12, 24-26]
Psoriasis	<i>Corynebacterium</i> <i>Propionibacterium</i> <i>Staphylococcus</i> <i>Streptococcus</i> <i>Malassezia ovalis</i> <i>M. furfur</i> <i>M. restricta</i>	A chronic form of dermal thickening and inflammation which may lead to arthritis.	[13-17,27-31]
Impetigo	<i>Staphylococcus aureus</i> <i>Streptococcus pyogenes</i>	Mostly facial and rapidly spreading tiny thin walled blister.	[32-41]
Cellulitis	<i>S. pyogenes</i> <i>S. aureus</i>	Acute inflammation usually results from bacterial exposure via various skin wounds and may also results in pain, swelling, erythema and fever.	[42-48]
Molluscum contagiosum	<i>Molluscipox</i>	Dermal lesion mainly on the palms and around the lips.	[49-59]
Tinea capitis	<i>Trichophyton tonsurans</i>	A commonly reported fungal infection of the scalp, hair shaft and hair follicles which often results in patchy hair loss, scaling and serious scalp inflammation.	[60-66]
Tinea pedis	<i>Trichophyton rubrum</i> <i>T. interdigitale</i> <i>Epidermophyton floccosum</i>	An inflammatory and ulcerative infection of feet which occurs not only on soles of feet but in different pattern in interdigital spaces.	[67-68]
Atopic dermatitis	<i>S. aureus</i>	Inflammation associated with severe rashes mainly on scalp, facial and other extremities.	[69-73]
Chronic wounds	Major microbial causative agents are: <i>Staphylococcus</i> sp. <i>Serratia</i> sp. <i>Clostridium</i> sp. Various fungal, protozoan and viral strains	Usually lasts for more than three months with prolonged severe inflammation, persistent infection, and drug-resistant microbial behavior.	[74-82]

Ring worm	<i>Trichophyton mentagrophytes</i> <i>T. rubrum</i> <i>Microsporum canis</i> <i>Candida albicans</i>	This infection usually spreads on nail bed, scalp and skin due to exposure of already infected items e.g., clothing, utensils, furniture and even via pets etc. The characteristic features of its pathology are the occurrence of gradually growing diameter reddish circular swollen dermal scars.	[83-85, 89]
Scabies	<i>S. aureus</i> <i>S. pyogenes</i>	Dermal itching which may convert into diverse severe forms like cellulitis abscesses, necrotizing fasciitis or it may result into renal impairment and septicemia.	[86-88]
Onychomycosis	Dermatophytes Yeasts Non-dermatophytes molds	Frequently reported fungal infection of nails which may occur on superficial, distal, lateral and proximal subungual sides and also in candidal form.	[5]

3. Control of microbial dermal disorders

Following preventive measures should be adapted to control commonly occurring skin microbial diseases (Figure 1):

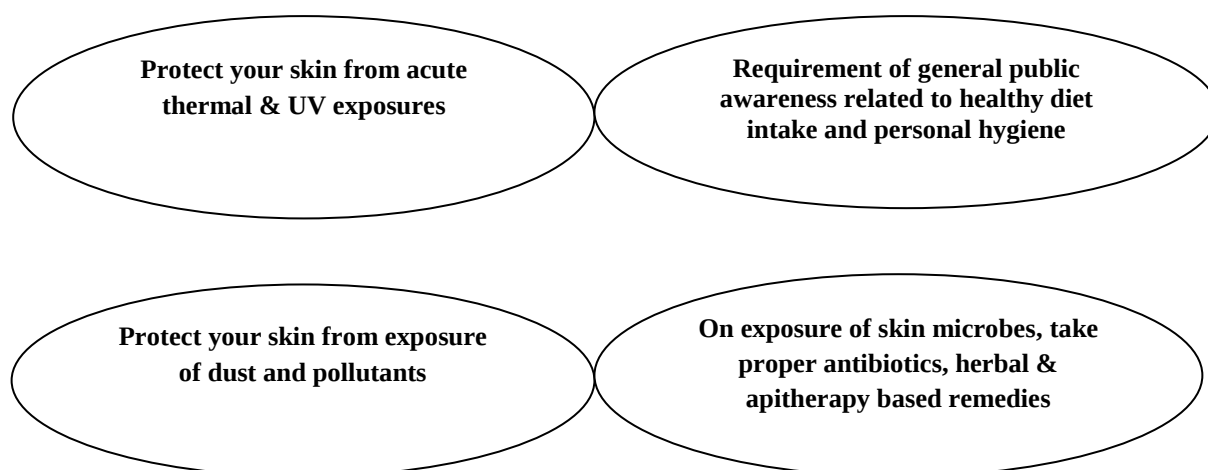


Figure 1: Control of Microbial skin diseases

4. Conclusion

Lack of general public awareness about personal hygiene is a major global problem especially of developing countries. Another factor is economic crisis as an outcome huge population has poor living standards and is more prone to skin infectious microbiota due to intake of improper and unhealthy diet, untidy living environment and inability to avail proper dermal treatment due to financial constraints. To control such skin disorders of microbial origin suitable remedies either apitherapy based, herbal or synthetic antibiotics should be utilized [4, 5, 90]. Moreover, personal hygiene based general public awareness programs should be introduced at national and international levels.

5. Future perspective

Future researchers should introduce better ideas of low cost alternatives of junk and staple food for common man at global level. Similarly, formation of side effects free skin care and dermal ailments' recovery products are also required, in this regard publicity of natural produce based items either of herbal, apiculture or other animals based which should also be ethically allowed, is need of current era. All such efforts will be more effective, if they are monitored and delivered globally to general public via electronic media which is currently accessible at individual level.

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